

SPERRY UNIVAC

basic systems MARKETING SUPPORT SERVICES

Bulletin

Number 64

December 82

SYSTEM 80
MIRAM MULTIKEY FILE PROCESSING
RPG II

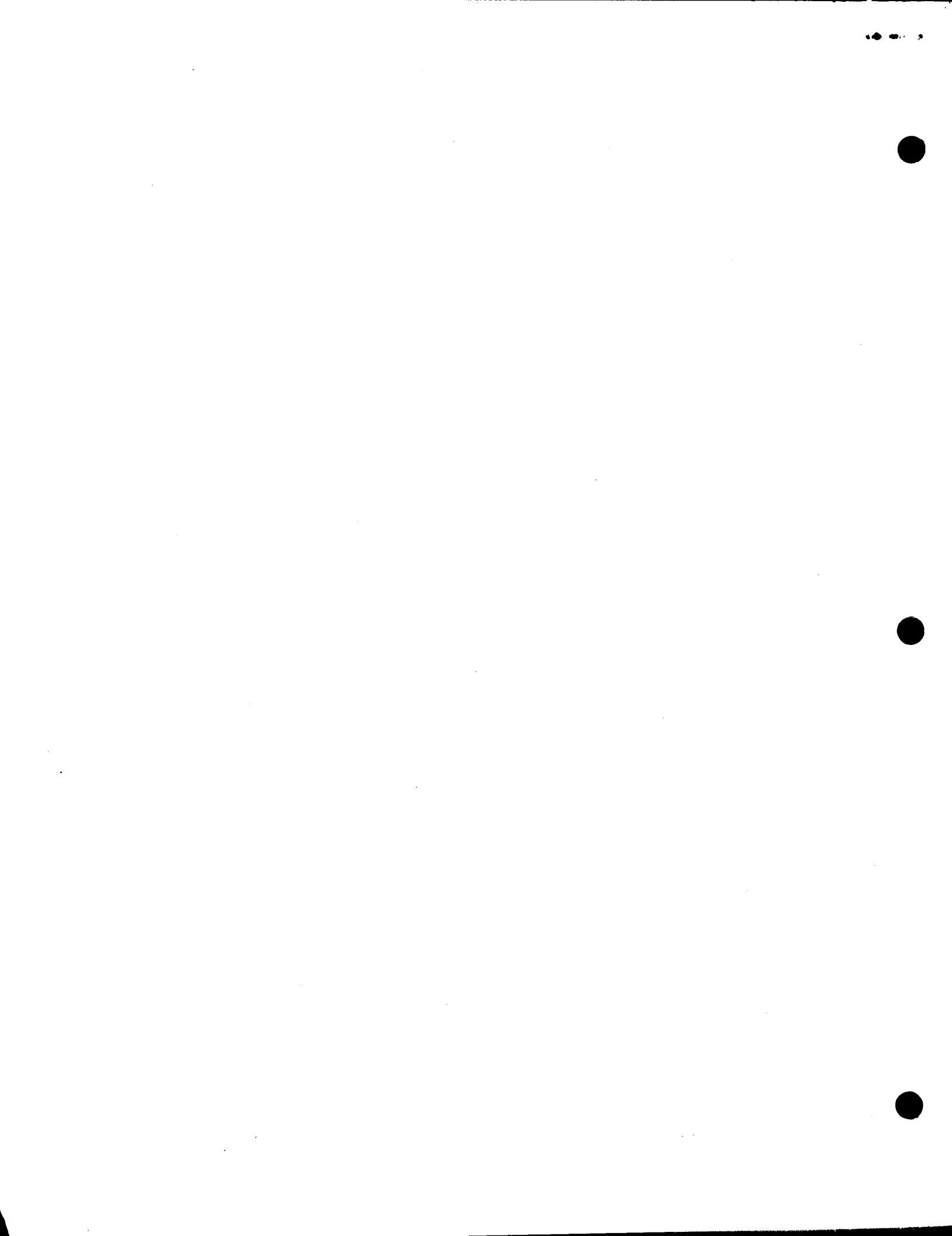
Abstract

This bulletin provides examples of RPG II programs and associated job control for processing multi-keyed MIRAM data files.

COMPANY CONFIDENTIAL "C"

FOR FURTHER INFORMATION CONTACT:
S/W MAINTAINABILITY AND INTEGRITY
MAIL STATION B103M
BLUE BELL, PA 19424
JOSEPH A. MCGINLEY (215)-542-6058
S/N -423-6058

ID CONTACT:
RALF THIMELL
BRIDGEHOUSE, LONDON
258-3738



SYSTEM 80 - RPG II MULTIKEY FILE PROCESSING - RELEASE 8.0

I. MULTIKEY FILE ENHANCEMENT:

UNDER OS/3 RELEASE 8.0, RPG II HAS BEEN ENHANCED TO ALLOW PROCESSING OF INDEXED FILES WITH MORE THAN 1 KEY OF REFERENCE. MIRAM FILES WITH FROM 1 TO 5 KEYS OF REFERENCE CAN NOW BE PROCESSED. EACH KEY CAN BE FROM 1 TO 80 CHARACTERS IN LENGTH WITH THE OPTION OF ALLOWING DUPLICATE KEY VALUES AND/OR CHANGES TO KEY VALUES.

II. RPG II CODING REQUIREMENTS:

A. FILES DESCRIPTION SPECIFICATION FORM:

| COLUMNS | CODING REQUIREMENTS |
|---------|--|
| 1 - 28 | STANDARD CODING FOR INDEXED FILES (SINGLE KEY) |
| 29 - 30 | MUST BE LEFT BLANK |
| 31 - 34 | STANDARD CODING FOR INDEXED FILES (SINGLE KEY) |
| 35 - 38 | MUST BE LEFT BLANK |
| 39 - 80 | STANDARD RPG II CODING |

B. CONTINUATION LINES (FILE DESCRIPTION)

| COLUMNS | CODING REQUIREMENTS |
|---------|---|
| 53 | K |
| 54 - 59 | KEYN (N=1 TO 5 - DENOTES KEY NUMBER) |
| 60 - 65 | START POSITION FOR KEYN VALUE IN RECORD |
| 66 - 67 | LENGTH OF KEY (FROM 1 TO 80 CHARACTERS) |
| 68 | D OR BLANK D - DUPLICATION OF KEYN VALUE ALLOWED BLANK - NO DUPLICATION OF KEYN VALUE |
| 69 | C OR BLANK C - CHANGES TO KEYN VALUE ALLOWED BLANK - NO CHANGES ALLOWED |

C. CALCULATION SPECIFICATIONS - SETK OPERATION:

| COLUMNS | CODING REQUIREMENTS |
|---------|--|
| 9 - 17 | CONDITIONS - OPTIONAL |
| 18 - 27 | FACTOR 1 - POSITION 18 - MUST CONTAIN A VALID LITERAL OR A 1 CHARACTER VARIABLE WITH A VALUE OF FROM 1 TO 5 TO SPECIFY THE KEY STRUCTURE TO REFERENCE THE FILE |
| 28 - 32 | OPERATION - SETK |
| 33 - 42 | FACTOR 2 - MUST CONTAIN THE FILE NAME USED IN COLUMNS 7 - 14 OF THE FILE DESCRIPTION SPECIFICATION FORM FOR THE MULTIKEYED FILE |
| 43 - 59 | RESULT FIELD - RESULTING INDICATORS - MUST BE BLANK |

NOTE: KEY "1" IS THE PRIMARY KEY OF REFERENCE UNLESS AN ALTERNATE KEY IS SPECIFIED BY USING THE "SETK" OPERATION IN THE CALCULATION SPECIFICATIONS.

THE "SETK" OPERATION WILL NOT BE FUNCTIONAL AND NORMAL PROCESSING FOR A SINGLE KEY INDEXED FILE WILL BE ASSUMED IF A "COMPLETE" KEY STRUCTURE IS NOT SPECIFIED ON THE FILE DESCRIPTION SPECIFICATION FORMS. CONTINUATION LINES (K IN COLUMN 53 OF FILE DESCRIPTION SPECIFICATIONS) MUST BE USED TO DESCRIBE KEY CHARACTERISTICS IF THE FILE HAS MORE THAN 1 KEY OF REFERENCE.

III. SAMPLE RPG II SPECIFICATION FORMS:

A. FILE DESCRIPTION SPECIFICATION FORM:

00003FMKFILE O F 96 96 AI DISK S

B. CONTINUATION LINES (COMPLETE KEY STRUCTURE - FILE DESCRIPTION):

| | | |
|--------|-------|--------|
| 00004F | KKEY1 | 110 |
| 00005F | KKEY2 | 31 9 |
| 00006F | KKEY3 | 43 8 |
| 00007F | KKEY4 | 51 7DC |
| 00008F | KKEY5 | 64 7 |

C. CALCULATIONS SPECIFICATION FORM:

| | | | |
|--------|----|---|-------------|
| 00056C | 50 | 1 | SETK MKFILE |
| 00060C | 51 | 2 | SETK MKFILE |
| 00064C | 52 | 3 | SETK MKFILE |
| 00068C | 53 | 4 | SETK MKFILE |
| 00072C | 54 | 5 | SETK MKFILE |

IV. SAMPLE PROGRAMS - MULTIKEY FILE PROCESSING:

EACH OF THE SAMPLE PROGRAMS PRESENTED USE A "5" KEYED MIRAM DATA FILE NAMED "MKFILE". THE PRIMARY PURPOSE OF THESE PROGRAMS IS TO DEMONSTRATE THE "EASE" OF PROCESSING A MULTIKEYED FILE IN RPG II IN A VARIETY OF PROCESSING SITUATIONS. FOR EXAMPLE, THE PROGRAMS WHICH CREATE, EXTEND AND UPDATE THE KEYED FILE UTILIZE INTERACTIVE DATA ENTRY TECHNIQUES IN RPG II. SCREEN PROMPTS ARE AUTOMATICALLY GENERATED FOR THE USER WITHOUT THE NEED TO CREATE AND FORMAT SCREENS BY USING THE SCREEN FORMAT GENERATOR IN A SEPARATE STEP. CUSTOMIZED WORKSTATION SCREENS CREATED BY USING THE SCREEN FORMAT GENERATOR ARE USED IN THE FILE INQUIRY PROGRAM. FOR EASE OF CODING, COPY MODULES AND AUTO REPORT ARE USED IN THE FIVE PROGRAMS WHICH SEQUENTIALLY PROCESS THE DATA FILE BY SELECTED KEY. THESE SAMPLE PROGRAMS ARE SIMPLY EXAMPLES OF SOME OF THE TECHNIQUES TO PROCESS MULTIKEYED FILES AND ARE NOT NECESSARILY THE MOST EFFICIENT METHODS.

A. CREMLT - CREATING A 5 KEYED MIRAM FILE

THIS PROGRAM UTILIZES INTERACTIVE DATA ENTRY TO CREATE A 5 KEY MIRAM FILE. THE KEY CHARACTERISTICS ARE AS FOLLOWS:

| POSITION | TYPE | FIELD NAME | DUPLICATES | CHANGES |
|----------|---------|------------|------------|---------|
| 1 - 10 | NUMERIC | IDNUM | NO | NO |
| 31 - 39 | NUMERIC | SSN | NO | NO |
| 43 - 50 | NUMERIC | INSNUM | NO | NO |
| 51 - 57 | NUMERIC | PHONE | YES | YES |
| 64 - 70 | NUMERIC | RETNUM | NO | NO |

PROMPT SCREENS ARE AUTOMATICALLY CREATED BASED ON THE RECORD DESCRIPTIONS OF THE CONSOLE FILE "INDATA".

00001H
 00002FINDATA IP F 97 CONSOLE
 00003FMKFILE O F 96 96 AI DISK S
 00004F KKEY1 110
 00005F KKEY2 31 9
 00006F KKEY3 43 8
 00007F KKEY4 51 7DC
 00008F KKEY5 64 7
 00009FPRNTR O F 132 132 OF PRINTER
 00010IINDATA AA 01 1 C1
 00011I 1 10 IDKEY
 00012I 2 110 IDNUM
 00013I 12 31 NAME
 00014I 32 400 SSN
 00015I 41 41 MSTAT
 00016I 42 430 EXEMPT
 00017I 44 510 INSNUM
 00018I 52 580 PHONE
 00019I 59 620 DEPT
 00020I 63 64 SALCL
 00021I 65 710 RETNUM
 00022I 72 770 STDATE
 00023I 78 97 TITLE
 000240MKFILE D 01
 000250 IDNUM 10
 000260 NAME 30
 000270 SSN 39
 000280 MSTAT 40
 000290 EXEMPT 42
 000300 INSNUM 50
 000310 PHONE 57
 000320 DEPT 61
 000330 SALCL 63
 000340 RETNUM 70
 000350 STDATE 76
 000360 TITLE 96
 000370PRNTR H 307 OF
 000380 OR 1P
 000390
 70 ** M U L T I K E Y '

| | | | |
|--------|-----|----|----------------------|
| 000400 | | | 80 'F I L E **' |
| 000410 | H 1 | OF | |
| 000420 | OR | 1P | |
| 000430 | | | 6 'ID' |
| 000440 | | | 24 'EMPLOYEE' |
| 000450 | | | 54 'SOCIAL MARITAL' |
| 000460 | | | 69 'EXEMP INS.' |
| 000470 | | | 91 'PHONE DEPT SC' |
| 000480 | | | 108 'RET. START' |
| 000490 | | | 123 'TITLE' |
| 000500 | D 2 | OF | |
| 000510 | OR | 1P | |
| 000520 | | | 7 'NUMBER' |
| 000530 | | | 22 'NAME' |
| 000540 | | | 54 'SECURITY STATUS' |
| 000550 | | | 80 'NUMBER NUMBER' |
| 000560 | | | 107 'NUMBER DATE' |
| 000570 | D 1 | 01 | |
| 000580 | | | IDNUM 10 |
| 000590 | | | NAME 32 |
| 000600 | | | SSN 45 - - - |
| 000610 | | | MSTAT 51 |
| 000620 | | | EXEMPT 59 |
| 000630 | | | INSNUM 71 |
| 000640 | | | PHONE 81 - - - |
| 000650 | | | DEPT 87 |
| 000660 | | | SALCL 91 |
| 000670 | | | RETRNUM 100 |
| 000680 | | | STDATETY 110 |
| 000690 | | | TITLE 132 |

JOB CONTROL TO COMPILE AND LINK CREMLT:

```
// JOB RPGEI&,,B000 RPG II COMPILE & LINK
// IF ('&PGM' NE '')S1
// QGBL PGM
//S1 NOP
//&PGM RPG IN=(OS3DTA,JAM.SRC),ERRFIL=(OS3DTA,JAM.ERF,JAM.EF1), X
/1 CONSOLE=INDATA
//&PGM LINK OUT=(OS3DTA,JAM.LOD)
/&
```

JOB STREAM TO EXECUTE CREMLT:

```
// JOB CREMLT,,D000
// QGBL PGM
// DVC 20 // LFD PRNTR
// DVC 200
// USE SFS
// UID $Y$MAS
// LFD INDATA
// DVC 60 // VOL OS3DTA // LBL MKFILE // LFD MKFILE,,INIT
// DVC 60 // VOL OS3DTA // LBL JAM.LOD
// LFD LOD
// EXEC &PGM,LOD
/&
```

NOTE: MKFILE MUST BE ALLOCATED BEFORE CREMLT IS EXECUTED.
AL MI,FIL=MKFILE,VSN= _____

B. MKFADD - ADDING RECORD TO MKFILE

"MKFADD" IS USED TO EXTEND THE ORIGINAL DATA FILE (MKFILE) CREATED BY SAMPLE PROGRAM "CREMLT". INTERACTIVE DATA ENTRY IS USED TO CREATE AND PRESENT SCREEN PROMPTS FOR THE RECORDS TO BE ADDED. EACH RECORD ADDED AT THE WORKSTATION IS WRITTEN TO THE PRINTER FILE. IF A RECORD ALREADY EXISTS IN MKFILE, A NOTE IS WRITTEN TO THE PRINTER FILE SPECIFYING DUPLICATE KEYS AND THE RECORD IS IGNORED. TO BE A UNIQUE (NEW) RECORD NO KEY FIELDS IN WHICH DUPLICATES ARE RESTRICTED MUST MATCH THOSE ALREADY EXISTING IN MKFILE. IF A RECORD IS DETERMINED TO BE UNIQUE, IT IS ADDED TO MKFILE. IT IS THE PROGRAMMER'S RESPONSIBILITY TO CHECK FOR DUPLICATES IN ALL KEY FIELDS IN WHICH DUPLICATES ARE NOT ALLOWED.

NOTE: WHEN USING THE CHAIN OPERATION, A 'NO HIT' INDICATOR SHOULD BE USED TO PREVENT ABNORMAL TERMINATION DUE TO A 'NO RECORD FOUND' CONDITION. OTHERWISE, THE H0 INDICATOR IS SET ON AND MUST BE SET OFF BY THE PROGRAMMER.

| | | | | | | | | | | |
|--------------|--------|----|-----|-----|---------|---------|------------|-----|--|--|
| 00001H | MKFADD | | | | | | | | | |
| 00002FINDATA | IP | F | 97 | 97 | CONSOLE | S | A | | | |
| 00003FMKFILE | UC | F | 96 | 96R | AI | DISK | | | | |
| 00004F | | | | | | KKEY1 | 110 | | | |
| 00005F | | | | | | KKEY2 | 31 | 9 | | |
| 00006F | | | | | | KKEY3 | 43 | 8 | | |
| 00007F | | | | | | KKEY4 | 51 | 7DC | | |
| 00008F | | | | | | KKEY5 | 64 | 7 | | |
| 00009FPRNTR | O | F | 132 | 132 | OF | PRINTER | | | | |
| 00010IINDATA | AA | 01 | 1 | C1 | | | | | | |
| 00011I | | | | | | 2 | 110IDNUM | | | |
| 00012I | | | | | | 12 | 31 NAME | | | |
| 00013I | | | | | | 32 | 400SSN | | | |
| 00014I | | | | | | 41 | 41 MSTAT | | | |
| 00015I | | | | | | 42 | 430EXEMPT | | | |
| 00016I | | | | | | 44 | 510INSNUM | | | |
| 00017I | | | | | | 52 | 580PHONE | | | |
| 00018I | | | | | | 59 | 620DEPT | | | |
| 00019I | | | | | | 63 | 64 SALCL | | | |
| 00020I | | | | | | 65 | 710RETPNUM | | | |
| 00021I | | | | | | 72 | 770STDAT | | | |
| 00022I | | | | | | 78 | 97 TITLE | | | |
| 00023IMKFILE | BB | 07 | | | | | | | | |
| 00024I | | | | | | 1 | 100IDNUM | | | |
| 00025I | | | | | | 11 | 30 NAME | | | |
| 00026I | | | | | | 31 | 390SSN | | | |
| 00027I | | | | | | 40 | 40 MSTAT | | | |
| 00028I | | | | | | 41 | 420EXEMPT | | | |
| 00029I | | | | | | 43 | 500INSNUM | | | |
| 00030I | | | | | | 51 | 570PHONE | | | |
| 00031I | | | | | | 58 | 610DEPT | | | |

00032I
 00033I
 00034I
 00035I
 00036C
 00037C
 00038C*** WRITE RECORD ENTERED TO PRINTER FILE ***
 00039C 01 EXCPT
 00040C*
 00041C** CHECK FOR DUPLICATE IDENTIFICATION NUMBER **
 00042C*
 00043C 01 1 SETK MKFILE SET KEY = IDNUM
 00044C 01 IDNUM CHAINMKFILE 20
 00045C*
 00046C** CHECK FOR DUPLICATE SOCIAL SECURITY NUMBER **
 00047C*
 00048C 01 20 2 SETK MKFILE SET KEY = SSN
 00049C 01 20 SSN CHAINMKFILE 21
 00050C*
 00051C** CHECK FOR DUPLICATE INSURANCE NUMBER **
 00052C*
 00053C 01 21 3 SETK MKFILE SET KEY = INSNUM
 00054C 01 21 INSNUM CHAINMKFILE 22
 00055C*
 00056C** CHECK FOR DUPLICATE RETIREMENT NUMBER **
 00057C*
 00058C 01 22 5 SETK MKFILE SET KEY = RETNUM
 00059C 01 22 RETNUM CHAINMKFILE 23
 00060C*
 00061C** 23 ON - NO DUP KEYS - WRITE RECORD TO MKFILE **
 00062C*
 00063C 01 23 SETON 10
 000640MKFILE DADD 10
 000650 IDNUM 10
 000660 NAME 30
 000670 SSN 39
 000680 MSTAT 40
 000690 EXEMPT 42
 000700 INSNUM 50
 000710 PHONE 57
 000720 DEPT 61
 000730 SALCL 63
 000740 RETNUM 70
 000750 STDATE 76
 000760 TITLE 96
 000770PRNTR H 307 OF
 000780 OR 1P
 000790 70 '*** M U L T I K E Y '
 000800 80 'F I L E ***'
 000810 H 1 OF
 000820 OR 1P
 000830 6 'ID'
 000840 24 'EMPLOYEE'
 000850 54 'SOCIAL' MARITAL'
 000860 69 'EXEMP' INS.'

| | | | | | |
|--------|-----|--------|----------|------------------------|---------|
| 000870 | | 91 | 'PHONE | DEPT | SC' |
| 000880 | | 108 | 'RET. | START' | |
| 000890 | | 123 | 'TITLE' | | |
| 000900 | D 2 | OF | | | |
| 000910 | OR | 1P | | | |
| 000920 | | | 7 | 'NUMBER' | |
| 000930 | | | 22 | 'NAME' | |
| 000940 | | | 54 | 'SECURITY | STATUS' |
| 000950 | | | 80 | 'NUMBER | NUMBER' |
| 000960 | | | 107 | 'NUMBER | DATE' |
| 000970 | E 1 | 01 | | | |
| 000980 | | | IDNUM | 10 | |
| 000990 | | | NAME | 32 | |
| 001000 | | | SSN | 45 | - - - |
| 001010 | | | MSTAT | 51 | |
| 001020 | | | EXEMPT | 59 | |
| 001030 | | | INSNUM | 71 | |
| 001040 | | | PHONE | 81 | - - - |
| 001050 | | | DEPT | 87 | |
| 001060 | | | SALCL | 91 | |
| 001070 | | | RETRNUM | 100 | |
| 001080 | | | STDATETY | 110 | |
| 001090 | | | TITLE | 132 | |
| 001100 | D 1 | N10 01 | | | |
| 001110 | | | 40 | 'INVALID RECORD - ' | |
| 001120 | | | 60 | 'DUPLICATE KEY VALUES' | |

JOB STREAM TO COMPILE AND LINK MKFADD:

```

// JOB RPGEI&,,B000    RPG II COMPILE & LINK
// IF ('&PGM' NE '')S1
// QGBL PGM
//S1 NOP
//&PGM    RPG    IN=(OS3DTA,JAM.SRC),ERRFIL=(OS3DTA,JAM.ERF,JAM.EF1),      X
//          CONSOLE=INDATA
//&PGM    LINK   OUT=(OS3DTA,JAM.LOD)
/&

```

JOB STREAM TO EXECUTE MKFADD:

```

// JOB MKFADD,,D000
// QGBL PGM
// DVC 20 // LFD PRNTR
// DVC 200
// USE SFS
// UID $Y$MAS
// LFD INDATA
// DVC 60 // VOL OS3DTA // LBL MKFILE // LFD MKFILE
// DVC 60 // VOL OS3DTA // LBL JAM.LOD
// LFD LOD
// EXEC &PGM,LOD
/&

```

C. MLINQ2 - INQUIRY TO RECORDS OF MKFILE

SCREEN FORMAT SERVICES IS USED TO CREATE PROMPT SCREENS FOR THIS WORKSTATION/MULTIKEYED FILE PROCESSING PROGRAM. THE PURPOSE OF THE PROGRAM IS TO DISPLAY SELECTED RECORDS ON THE WORKSTATION SCREEN. SEPARATE PROMPT SCREENS ARE USED FOR EACH OF THE FIVE KEYS OF REFERENCE.

PROMPT SCREENS PRESENTED:

1. SCREEN01 - MAIN MENU

```
=====
! SCREEN01
!
!     ***  MULTIKEY FILE INQUIRY  ***
!     ***  KEY MENU   ***
!
! ****
!
!      KEY NUMBER          KEY FIELD
! ======  ======
!
!      1      EMPLOYEE IDENTIFICATION NUMBER
!      2      SOCIAL SECURITY NUMBER
!      3      INSURANCE ACCOUNT NUMBER
!      4      BUSINESS PHONE NUMBER
!      5      RETIREMENT ACCOUNT NUMBER
!
!      ENTER KEY REFERENCE NUMBER
!      TERMINATE SESSION      -
!
!F15 - TERMINATES SESSION
=====
```

2. SCREEN02 - EMPLOYEE IDENTIFICATION NUMBER (KEY 1 OF MKFILE)

```
=====
! SCREEN02
!
!     ***  MULTIKEY FILE INQUIRY  ***
!
!      ENTER:
!
!      EMPLOYEE IDENTIFICATION NUMBER _____
!
!F11 - RETURN TO KEY MENU
!F15 - TERMINATE UPDATE SESSION
=====

```

3. SCREEN03 - EMPLOYEE SOCIAL SECURITY NUMBER (KEY 2 OF MKFILE)

SCREEN03

*** MULTIKEY FILE INQUIRY ***

ENTER:

SOCIAL SECURITY NUMBER ____-__-

F11 - RETURN TO KEY MENU

F15 - TERMINATE UPDATE SESSION

4. SCREEN04 - EMPLOYEE INSURANCE NUMBER (KEY 3 OF MKFILE)

SCREEN04

*** MULTIKEY FILE INQUIRY ***

ENTER:

INSURANCE ACCOUNT NUMBER ____

F11 - RETURN TO KEY MENU

F15 - TERMINATE UPDATE SESSION

5. SCREEN05 - EMPLOYEE PHONE NUMBER (KEY 4 OF MKFILE)

SCREEN05

*** MULTIKEY FILE INQUIRY ***

ENTER:

BUSINESS PHONE NUMBER ____

F11 - RETURN TO KEY MENU

F15 - TERMINATE UPDATE SESSION

6. SCREEN06 - EMPLOYEE RETIREMENT NUMBER (KEY 5 OF MKFILE)

SCREEN06

*** MULTIKEY FILE INQUIRY ***

ENTER:

RETIREMENT ACCOUNT NUMBER _____

F11 - RETURN TO KEY MENU

F15 - TERMINATE UPDATE SESSION

7. SCREEN07 - DATA RECORD DISPLAY

SCREEN07

*** MKFILE RECORD DISPLAY ***

FIELD
NUMBER

FIELD
NAME

FIELD
DATA

| | | |
|----|---------------------------|-----------------|
| 1 | IDENTIFICATION NUMBER | _____ |
| 2 | NAME | _____ |
| 3 | SOCIAL SECURITY NUMBER | _____ |
| 4 | MARITAL STATUS CODE | _____-__ |
| 5 | NUMBER OF EXEMPTIONS | - |
| 6 | INSURANCE ACCOUNT NUMBER | _____- |
| 7 | BUSINESS PHONE NUMBER | _____ |
| 8 | DEPARTMENT NUMBER | _____- |
| 9 | SALARY CLASSIFICATION | _____- |
| 10 | RETIREMENT ACCOUNT NUMBER | _____- |
| 11 | START OF EMPLOYMENT DATE | _____/____/____ |
| 12 | JOB TITLE | _____ |

XMIT TO CONTINUE

8. SCREEN08 - ERROR MESSAGE SCREEN - NO HIT ON CHAIN OPERATION

SCREEN08

*** MULTIKEY FILE INQUIRY ***
*** ERROR MESSAGE ***

INVALID RECORD KEY ENTERED
NO MATCHING KEY IN MKFILE
XMIT AND RE-ENTER

F15 - TERMINATE INQUIRY SESSION

XMIT TO CONTINUE

MLINQ2 - SOURCE LISTING

| MLINQ2 | | | |
|--------------|----|-------|--------------|
| 00001H | | | |
| 00002FWRKSTN | CP | F | 96 |
| 00003FMKFILE | IC | F | 96 96R AI |
| 00004F | | | WORKSTN |
| 00005F | | | DISK |
| 00006F | | | S |
| 00007F | | | KKEY1 110 |
| 00008F | | | KKEY2 31 9 |
| 00009IWRKSTN | AA | 01 | 1 C |
| 00010I | OR | | 1 C1 |
| 00011I | | | 2 20KEY |
| 00012I | | | 3 3 TERM |
| 00013I | BB | 02 | 1 C2 |
| 00014I | | | 2 110KEYVAL |
| 00015I | BD | 04 | 1 CY |
| 00016IMKFILE | CC | 03 | |
| 00017I | | | 1 100IDNUM |
| 00018I | | | 11 30 NAME |
| 00019I | | | 31 390SSN |
| 00020I | | | 40 40 MSTAT |
| 00021I | | | 41 420EXEMPT |
| 00022I | | | 43 500INSNUM |
| 00023I | | | 51 570PHONE |
| 00024I | | | 58 610DEPT |
| 00025I | | | 62 63 SALCL |
| 00026I | | | 64 700RETNUM |
| 00027I | | | 71 760STDAT |
| 00028I | | | 77 96 TITLE |
| 00029C | | SETOF | 103090 |
| 00030C | | SETOF | 800714 |
| 00031C | | SETOF | 7035 |

| | | | | |
|----------|-------|-------------|-------------|--------|
| 00032C | | SETOF | | 505152 |
| 00033C | | SETOF | | 535431 |
| 00034C | | SETOF | | 323334 |
| 00035C | KK | Z-ADD2 | SCN | 10 |
| 00036C | KK | SETON | | 10 |
| 00037C | KK | MOVE 0 | KEY | 10 |
| 00038C | KK | GOTO END | | |
| 00039C | 04 | EXSR INPUT1 | | |
| 00040C | 04 | GOTO END | | |
| 00041C | 01 | TERM | COMP 'Y' | |
| 00042C | 01 | KEY | COMP 0 | LR |
| 00043C | 07 | SCN | MOVE 2 | 07 |
| 00044C | 07 | SCN | SETON | 10 |
| 00045C | 07 | SCN | GOTO END | |
| 00046C | | SCN | COMP 2 | 14 |
| 00047C | 14 | | EXSR INPUT1 | |
| 00048C | 14 | | GOTO END | |
| 00049C | | SCN | COMP 5 | |
| 00050C | 70 02 | SCN | EXSR INPUT2 | 70 |
| 00051C | 70 | | GOTO END | |
| 00052C | | SCN | COMP 1 | |
| 00053C | 10 | | MOVE 2 | 10 |
| 00054C | | END | TAG | |
| 00055CSR | | INPUT2 | BEGSR | |
| 00056CSR | | KEY | COMP 1 | |
| 00057CSR | 50 | 1 | SETK MKFILE | 50 |
| 00058CSR | 50 | | MOVEKEYVAL | |
| 00059CSR | 50 | | GOTO CHFIL | |
| 00060CSR | | KEY | COMP 2 | |
| 00061CSR | 51 | 2 | SETK MKFILE | 51 |
| 00062CSR | 51 | | MOVEKEYVAL | |
| 00063CSR | 51 | | GOTO CHFIL | |
| 00064CSR | | KEY | COMP 3 | |
| 00065CSR | 52 | 3 | SETK MKFILE | 52 |
| 00066CSR | 52 | | MOVEKEYVAL | |
| 00067CSR | 52 | | GOTO CHFIL | |
| 00068CSR | | KEY | COMP 4 | |
| 00069CSR | 53 | 4 | SETK MKFILE | 53 |
| 00070CSR | 53 | | MOVEKEYVAL | |
| 00071CSR | 53 | | GOTO CHFIL | |
| 00072CSR | | KEY | COMP 5 | |
| 00073CSR | 54 | 5 | SETK MKFILE | 54 |
| 00074CSR | 54 | | MOVEKEYVAL | |
| 00075CSR | 54 | | GOTO CHFIL | |
| 00076CSR | | CHFIL | TAG | |
| 00077CSR | 50 | CH1 | CHAINMKFILE | 80 |
| 00078CSR | 51 | CH2 | CHAINMKFILE | 80 |
| 00079CSR | 52 | CH3 | CHAINMKFILE | 80 |
| 00080CSR | 53 | CH4 | CHAINMKFILE | 80 |
| 00081CSR | 54 | CH5 | CHAINMKFILE | 80 |
| 00082CSR | 80 | | SETON | 90 |
| 00083CSR | 90 | | Z-ADD1 | SCN |
| 00084CSR | | | ENDSR | 10 |
| 00085CSR | | INPUT1 | BEGSR | |
| 00086CSR | | | Z-ADD5 | SCN |
| | | | | 10 |

| | | | |
|--------------|-----|---------|-----------|
| 00087CSR | | SETON | 30 |
| 00088CSR | KEY | COMP 1 | 31 |
| 00089CSR | KEY | COMP 2 | 32 |
| 00090CSR | KEY | COMP 3 | 33 |
| 00091CSR | KEY | COMP 4 | 34 |
| 00092CSR | KEY | COMP 5 | 35 |
| 00093CSR | | ENDSR | |
| 000940WRKSTN | D | 10 | |
| 000950 | | | K4 'SCR1' |
| 000960 | D | 30 31 | |
| 000970 | | | K4 'SCR2' |
| 000980 | D | 30 32 | |
| 000990 | | | K4 'SCR3' |
| 001000 | D | 30 33 | |
| 001010 | | | K4 'SCR4' |
| 001020 | D | 30 34 | |
| 001030 | | | K4 'SCR5' |
| 001040 | D | 30 35 | |
| 001050 | | | K4 'SCR6' |
| 001060 | D | 90 03 | |
| 001070 | | | K4 'SCR7' |
| 001080 | | IDNUM | 10 |
| 001090 | | NAME | 30 |
| 001100 | | SSN | 39 |
| 001110 | | MSTAT | 40 |
| 001120 | | EXEMPT | 42 |
| 001130 | | INSNUM | 50 |
| 001140 | | PHONE | 57 |
| 001150 | | DEPT | 61 |
| 001160 | | SALCL | 63 |
| 001170 | | RETPNUM | 70 |
| 001180 | | STDATE | 76 |
| 001190 | | TITLE | 96 |
| 001200 | D | 80 | |
| 001210 | | | K4 'SCR8' |

JOB STREAM TO COMPILE AND LINK MLINQ2

```

// JOB RPGII&,,B000    RPG II COMPILE & LINK
// IF ('&PGM' NE '')S1
// QGBL PGM
//S1 NOP
//&PGM    RPG    IN=(OS3DTA,JAM.SRC)
//&PGM    LINK   OUT=(OS3DTA,JAM.LOD)
/&

```

JOB STREAM TO EXECUTE MLINQ2:

```
// JOB MLTINQ,,D000      *** WRKSTN PROG ***
// IF ('&PGM' NE '')S1
// QGBL PGM
//S1 NOP
// DVC 20 // LFD PRNTR
// DVC 50 // VOL OS3DTA
// LBL MKFILE // LFD MKFILE
// DVC 50 // VOL OS3DTA
// LBL JAM.FMT // LFD FMT
// DVC 200
// USE SFS,FMT
// UID $Y$MAS
// LFD WRKSTN
// DVC 50 // VOL OS3DTA
// LBL JAM.LOD // LFD LOD
// EXEC &PGM,LOD
/&
```

D. MKUPD - UPDATING MKFILE

THIS PROGRAM IS USED TO UPDATE RECORDS EXISTING IN THE "MKFILE". INTERACTIVE DATA ENTRY PROCESSING IS UTILIZED TO AUTOMATICALLY GENERATE FORMATTED SCREEN PROMPTS FOR EACH KEY OF THE MULTIKEYED FILE. FUNCTION KEYS 1 TO 5 ARE ENTERED TO PRESENT KEY PROMPT SCREENS FOR KEY 1 TO 5 RESPECTIVELY. USERS ENTER KEY VALUE, FIELD NUMBER TO BE UPDATED (FLDNUM), AND REPLACEMENT DATA FOR FIELD (FLDATA). FUNCTION KEY 15 IS ENTERED TO TERMINATE WORKSTATION INPUT AND UPDATE PROCESSING.

NOTE: SEE TECHNICAL BULLETIN 99 FOR SAMPLE SCREENS AND PROGRAM EXECUTION RUN OF MKUPD.

| JCS01H | | | | | MKUPD |
|--------------|----|----|-----------|---------|-----------|
| 00002FINDATA | IP | F | 33 | CONSOLE | |
| 00003FMKFILE | UC | F | 96 96R AI | DISK | S |
| 00004F | | | | KKEY1 | 110 |
| 00005F | | | | KKEY2 | 31 9 |
| 00006F | | | | KKEY3 | 43 8 |
| 00007F | | | | KKEY4 | 51 7DC |
| 00008F | | | | KKEY5 | 64 7 |
| 00010IINDATA | AA | 01 | 1 C1 | | |
| 00011I | | | | 1 | 10IDKEY |
| 00012I | | | | 2 | 110IDNUM |
| 00013I | | | | 12 | 130FLDNUM |
| 00014I | | | | 14 | 33 FLDATA |
| 00015I | AB | 02 | 1 C2 | | |
| 00016I | | | | 1 | 10IDKEY |
| 00017I | | | | 2 | 100SSN |
| 00018I | | | | 11 | 120FLDNUM |
| 00019I | | | | 13 | 32 FLDATA |

| | | | | |
|--------------|-------|--------|--------|--------------|
| 00020I | AC | 03 | 1 C3 | |
| 00021I | | | | 1 10IDKEY |
| 00022I | | | | 2 90INSNUM |
| 00023I | | | | 10 110FLDNUM |
| 00024I | | | | 12 31 FLDATA |
| 00025I | AD | 04 | 1 C4 | |
| 00026I | | | | 1 10IDKEY |
| 00027I | | | | 2 80PHONE |
| 00028I | | | | 9 100FLDNUM |
| 00029I | | | | 11 30 FLDATA |
| 00030I | AE | 05 | 1 C5 | |
| 00031I | | | | 1 10IDKEY |
| 00032I | | | | 2 80RETNUM |
| 00033I | | | | 9 100FLDNUM |
| 00034I | | | | 11 30 FLDATA |
| 00035IMKFILE | BB | 07 | | |
| 00036I | | | | 1 100IDNUM |
| 00037I | | | | 11 30 NAME |
| 00038I | | | | 31 390SSN |
| 00039I | | | | 40 40 MSTAT |
| 00040I | | | | 41 420EXEMPT |
| 00041I | | | | 43 500INSNUM |
| 00042I | | | | 51 570PHONE |
| 00043I | | | | 58 610DEPT |
| 00044I | | | | 62 63 SALCL |
| 00045I | | | | 64 700RETNUM |
| 00046I | | | | 71 760STDATE |
| 00047I | | | | 77 96 TITLE |
| 00048C | | | | 99 |
| 00049C | | | FLDNUM | SETOF |
| 00051C | 99 | | | COMP 0 |
| | | | | GOTO END |
| 00052C | | | | SETOF |
| 00053C | | | | 212223 |
| 00054C | | | | SETOF |
| | | | | 242526 |
| 00055C | | | | SETOF |
| | | | | 272850 |
| 00056C | 01 | 1 | | SETK MKFILE |
| 00057C | 01 | IDNUM | | CHAINMKFILE |
| 00058C | N50 | | | EXSR UPDTE |
| 00059C | 01N50 | | | GOTO END |
| 00060C | 02 | 2 | | SETK MKFILE |
| 00061C | 02 | SSN | | CHAINMKFILE |
| 00062C | N50 | | | EXSR UPDTE |
| 00063C | 01N50 | | | GOTO END |
| 00064C | 03 | 3 | | SETK MKFILE |
| 00065C | 03 | INSNUM | | CHAINMKFILE |
| 00066C | N50 | | | EXSR UPDTE |
| 00067C | 01N50 | | | GOTO END |
| 00068C | 04 | 4 | | SETK MKFILE |
| 00069C | 04 | PHONE | | CHAINMKFILE |
| 00070C | N50 | | | EXSR UPDTE |
| 00071C | 01N50 | | | GOTO END |
| 00072C | 05 | 5 | | SETK MKFILE |
| 00073C | 05 | RETNUM | | CHAINMKFILE |
| 00074C | N50 | | | EXSR UPDTE |
| 00075C | 01N50 | | | GOTO END |
| 00076C | | END | | TAG |

| | | | | |
|----------------|--------|--------------|-----------|----|
| 00078CSR | UPDTE | BEGSR | | |
| 00079CSR | FLDNUM | COMP 2 | | 21 |
| 00080CSR 21 | | MOVEFLDATA | NAME 20 | |
| 00081CSR 21 | | GOTO END2 | | |
| 00082CSR | FLDNUM | COMP 4 | | 22 |
| 00083CSR 22 | | MOVEFLDATA | MSTAT 1 | |
| 00084CSR 22 | | GOTO END2 | | |
| 00085CSR | FLDNUM | COMP 5 | | 23 |
| 00086CSR 23 | | MOVEFLDATA | EXEMPT 20 | |
| 00087CSR 23 | | GOTO END2 | | |
| 00088CSR | FLDNUM | COMP 7 | | 24 |
| 00089CSR 24 | | MOVEFLDATA | PHONE 70 | |
| 00090CSR 24 | | GOTO END2 | | |
| 00091CSR | FLDNUM | COMP 8 | | 25 |
| 00092CSR 25 | | MOVEFLDATA | DEPT 40 | |
| 00093CSR 25 | | GOTO END2 | | |
| 00094CSR | FLDNUM | COMP 9 | | 26 |
| 00095CSR 26 | | MOVEFLDATA | SALCL 2 | |
| 00096CSR 26 | | GOTO END2 | | |
| 00097CSR | FLDNUM | COMP 11 | | 27 |
| 00098CSR 27 | | MOVEFLDATA | STDAT0060 | |
| 00099CSR 27 | | GOTO END2 | | |
| 00100CSR | FLDNUM | COMP 12 | | 28 |
| 00101CSR 28 | | MOVEFLDATA | TITLE 20 | |
| 00102CSR | END2 | TAG | | |
| 00103CSR | | ENDSR | | |
| 001040MKFILE D | | N50N99 07 | | |
| 001050 | | IDNUM 10 | | |
| 001060 | | NAME 30 | | |
| 001070 | | SSN 39 | | |
| 001080 | | MSTAT 40 | | |
| 001090 | | EXEMPT 42 | | |
| 001100 | | INNSNUM 50 | | |
| 001110 | | PHONE 57 | | |
| 001120 | | DEPT 61 | | |
| 001130 | | SALCL 63 | | |
| 001140 | | RETRNUM 70 | | |
| 001150 | | STDAT0060 76 | | |
| 001160 | | TITLE 96 | | |

JOB CONTROL TO COMPILE AND LINK MKUPD:

```

// JOB RPGEI&,,B000    RPG II COMPILE & LINK
// IF ('&PGM' NE '')S1
// QBL PGM
//S1 NOP
//&PGM  RPG IN=(OS3DTA,JAM.SRC),ERRFIL=(OS3DTA,JAM.ERF,JAM.EF1), X
/1      CONSOLE=INDATA
//&PGM  LINK OUT=(OS3DTA,JAM.LOD)
/&

```

JOB CONTROL TO EXECUTE MKUPD:

```
// JOB MLTUP2&&,,D000
// IF ('&PGM' NE '')S1
// QLBL PGM
//S1 NOP
// DVC 20 // LFD PRNTR
// DVC 200
// USE SFS
// UID $Y$MAS
// LFD INDATA
// DVC 60 // VOL OS3DTA // LBL MKFILE // LFD MKFILE
// DVC 60 // VOL OS3DTA // LBL JAM.LOD
// LFD LOD
// EXEC &PGM,LOD
/&
```

E. MSKEY1 TO MSKEY5 - SEQUENTIAL PROCESSING OF MKFILE

THESE 5 PROGRAMS SEQUENTIALLY PROCESS MKFILE BY USING THE SETK OPERATION TO SELECT KEY STRUCTURE. /COPY STATEMENTS WERE USED TO SAVE REPEATEDLY CODING THE SAME FILE DESCRIPTION, INPUT AND OUTPUT SPECIFICATION FORMS. THE COMMON SOURCE CODING LINES WERE STORED IN A SEPARATE LIBRARY FILE (JAM.COPY) AS MODULES "MKF", "MKIN" AND "MKPRNTR" AND CONTAIN:

MKF: COMMON FILE DESCRIPTION SPECIFICATIONS FOR "MKFILE"

| | | | | | | | |
|--------------|-----|---|-----|-----|----|---------|--------|
| 00003FMKFILE | IPE | F | 96 | 96 | AI | DISK | S |
| 00004F | | | | | | KKEY1 | 110 |
| 00005F | | | | | | KKEY2 | 31 9 |
| 00006F | | | | | | KKEY3 | 43 8 |
| 00007F | | | | | | KKEY4 | 51 7DC |
| 00008F | | | | | | KKEY5 | 64 7 |
| 00009FPRNTR | O | F | 132 | 132 | OF | PRINTER | |

MKIN: COMMON INPUT SPECIFICATIONS FOR "MKFILE"

| | | | |
|--------------|----|----|--------------|
| 00023IMKFILE | AA | 01 | |
| 00024I | | | 1 100IDNUM |
| 00025I | | | 11 30 NAME |
| 00026I | | | 31 390SSN |
| 00027I | | | 40 40 MSTAT |
| 00028I | | | 41 420EXEMPT |
| 00029I | | | 43 500INSNUM |
| 00030I | | | 51 570PHONE |
| 00031I | | | 58 610DEPT |
| 00032I | | | 62 63 SALCL |
| 00033I | | | 64 700RETNUM |
| 00034I | | | 71 760STDATE |
| 00035I | | | 77 96 TITLE |

MKPRNTR: COMMON OUTPUT SPECIFICATIONS FOR "MKFILE"

```

000890PRNTR H 307 OF
000900 OR 1P
000910
000920 70 '** M U L T I K E Y '
000930 H 1 OF
000940 OR 1P
000950 80 'F I L E **'
000960
000970 6 'ID'
000980 24 'EMPLOYEE'
000990 54 'SOCIAL MARITAL'
001000 69 'EXEMP INS.'
001010 91 'PHONE DEPT SC'
001020 108 'RET. START'
001030 123 'TITLE'

001040 H 2 OF
001050 OR 1P
001060 7 'NUMBER'
001070 22 'NAME'
001080 54 'SECURITY STATUS'
001090 80 'NUMBER NUMBER'
001100 107 'NUMBER DATE'

001110 IDNUM 10
001120 NAME 32
001130 SSN 45
001140 MSTAT 51
001150 EXEMPT 59
001160 INSNUM 71
001170 PHONE 81
001180 DEPT 87
001190 SALCL 91
001200 RETNUM 100
001210 STDATEY 110
001220 TITLE 132

```

MSKEY1 TO MSKEY5: SEQUENTIAL PROCESSING OF "MKFILE" BY SELECTED KEY

THESE 5 PROGRAMS PROCESS "MKFILE" SEQUENTIALLY BY SELECTED KEY USING THE "SETK" OPERATION. THESE ARE BATCH JOBS AND EACH PRODUCES A PRINTED LISTING OF THE "MKFILE" IN THE DESIGNATED ORDER.

1."MSKEY1": PROCESSING SEQUENTIALLY BY KEY 1 (IDNUM - EMPLOYEE IDENTIFICATION NUMBER)

UCJSA,JAM.AUTO

```

H
F/COPY JC,MKF
I/COPY JC,MKIN
C 01 FIRST ADD 1 FIRST 150
C 01 FIRST COMP 1
C 98 1 SETK MKFILE
O/COPY JC,MKPRNTR

```

MSKEY1

98

2."MSKEY2": PROCESSING SEQUENTIALLY BY KEY 2 (SSN - EMPLOYEE SOCIAL SECURITY NUMBER)

UCJSA,JAM.AUTO

H
F/COPY JC,MKF
I/COPY JC,MKIN
C 01 FIRST ADD 1 FIRST 150
C 01 FIRST COMP 1
C 98 2 SETK MKFILE
O/COPY JC,MKPRNTR

MSKEY2

3."MSKEY3": PROCESSING SEQUENTIALLY BY KEY 3 (INSNUM - EMPLOYEE INSURANCE NUMBER)

UCJSA,JAM.AUTO

H
F/COPY JC,MKF
I/COPY JC,MKIN
C 01 FIRST ADD 1 FIRST 150
C 01 FIRST COMP 1
C 98 3 SETK MKFILE
O/COPY JC,MKPRNTR

MSKEY3

4."MSKEY4": PROCESSING SEQUENTIALLY BY KEY 4 (PHONE - EMPLOYEE BUSINESS PHONE NUMBER)

UCJSA,JAM.AUTO

H
F/COPY JC,MKF
I/COPY JC,MKIN
C 01 FIRST ADD 1 FIRST 150
C 01 FIRST COMP 1
C 98 4 SETK MKFILE
O/COPY JC,MKPRNTR

MSKEY4

5."MSKEY5": PROCESSING SEQUENTIALLY BY KEY 5 (RETRNUM - EMPLOYEE RETIREMENT ACCOUNT NUMBER)

UCJSA,JAM.AUTO

H
F/COPY JC,MKF
I/COPY JC,MKIN
C 01 FIRST ADD 1 FIRST 150
C 01 FIRST COMP 1
C 98 5 SETK MKFILE
O/COPY JC,MKPRNTR

MSKEY5

NOTE: Each time a "SETK" command is issued, the file record pointer is reset to point to the first record of the data file.

JOB CONTROL TO COMPILE AND LINK MSKEY1 TO MSKEY5:

```
// JOB AUTRPG2&      COMPILE....ERRFIL OPTION ADDED  
// OPTION JOB DUMP  
// IF ('&PGM' NE '')S1  
// QGBL PGM  
//S1 NOP  
// DVC 50  
// VOL OS3DTA  
// LBL JAM.COPY  
// LFD JC  
// DVC 50  
// VOL OS3DTA  
// LBL JAM.AUTO  
// LFD JSA  
//&PGM AUTRPG IN=(OS3DTA,JAM.SRC),ERRFIL=(OS3DTA,JAM.ERF,JAM.EF1)  
//&PGM LINK OUT=(OS3DTA,JAM.LOD)  
/&
```

JOB CONTROL TO EXECUTE MSKEY1 TO MSKEY5:

```
// JOB MSKEY&&,D000  
// IF ('&PGM' NE '')S1  
// QGBL PGM  
//S1 NOP  
// DVC 20 // LFD PRNTR  
// DVC 60 // VOL OS3DTA // LBL MKFILE // LFD MKFILE  
// DVC 60 // VOL OS3DTA // LBL JAM.LOD  
// LFD LOD  
// EXEC &PGM,LOD  
/&
```